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mod. IO-CB/DM-08TS-00

M.U. IO-CB/IO-DM-08TS-1/04.9
Cod. J30-478-1ADM-08TS IE

User manual

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CANopen I/O module 8 Digital Programmable Input/Output mod. IO-CB/DM-08TS-00

Each of the I/O terminals can be programmed as either Input or Output
Two of the inputs can perform
- pulse counting
- pulse frequency measurements
- pulse width measurements

Two of the outputs can perform
- PWM output
- Single pulse output



Applicable standards

The DM-08TS module is suited for the CiA DS301 protocol [1] and implements the CiA DS401 standard Device Profile [2].

Warning

The product described in this manual should only be installed, operated and maintained by qualified application programmers and software engineers who are familiar with automation safety concepts and applicable national standards.

Characteristics

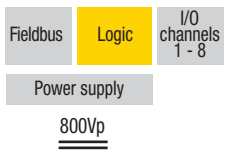
Technical data

Inputs		Outputs	
Number of channels	8 (input + output channels)		
Number of counters	2 (16 bit)	Number of PWM output	2
Polarity (EN 61131-2 type 2)	Sink (PNP)	Polarity (High side)	Source (PNP)
UL (state 0)	-3...11/5 Vdc	Output Voltage (nominal)	24 Vdc
UT (transition)	5...11 Vdc	Output Current	0.5 A
UH (state 1)	11...30 Vdc	Output current total	4A (continuous)
Input impedance	5 kΩ	ON/OFF delay	< 5 ms
ON/OFF delay	5 ms	PWM Period	min: 250 µs
Max. counter frequency	20 kHz		max: 65s
Min. pulse width	25 µs	PWM Duty Cycle	0.0...100.0 %
		Output Single Pulse width	min: 5 ms
			max: 65536 ms

General

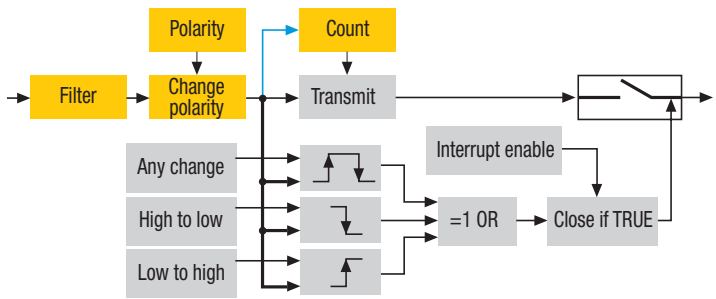
3 way isolation	800 Vp
Power supply	24 Vdc; -15...+25%
Power consuption	3.5 W
Overvoltage protection	40 Vdc
Dimensions	L: 76; H: 110; W: 65
Weight	220 g
Safety regulations EN61010-1	**Isolation class II** (50Vrms), Installation cathegory II, Pollution degree 2
CE marking	EN61131-2

3 way isolation diagram

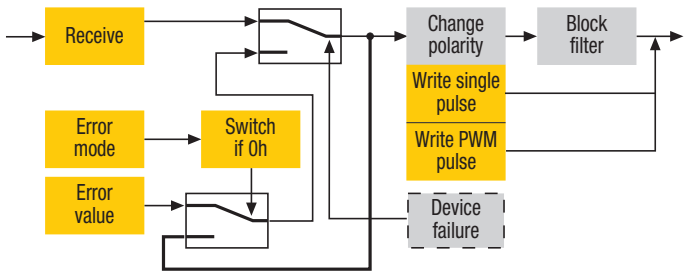


Functional Block Diagram

For each input



For each output



Environment

	Operating	Storage
Temperature	-10...+65°C	-40...+85°C
Relative Humidity	5...95% non condensing Appropriate measures must be taken against humidity >85%	5...95% non condensing For a short period, slight condensation may appear on the housing
Mounting	Vertical, free air	
Protection	IP20	
Vibrations (3 axes)	10...57Hz 0.0375mm 57...150Hz 0.5g	
Shock (3 axes)	15g, 11ms half sine	

PDOs used by the module

TPDO used by the module when the terminals are set as input channels

TPDO	Properties	Mapped objects	Index	Sub-index
TPDO1	COBID: 180h+ NodeID	Read Digital input	6000h	01h
	Transmission Type: FFh	Read Input Latch	2011h	01h
		Read Input Wait	2012h	01h
TPDO 2	COBID: 280h+ NodeID	Input Frequency Value (ch 1)	2006h	01h
	Transmission Type: FFh	Input Frequency Value (ch 2)	2006h	02h
TPDO 3	COBID: 380h+ NodeID	Input count Value (ch 1)	2007h	01h
	Transmission Type: FFh	Input count Value (ch 2)	2007h	02h
TPDO 4	COBID: 480h+ NodeID	Input period Value (ch 1)	2008h	01h
	Transmission Type: FFh	Input period Value (ch 2)	2008h	02h

Note: The transmission type is configurable; FFh is the default value.

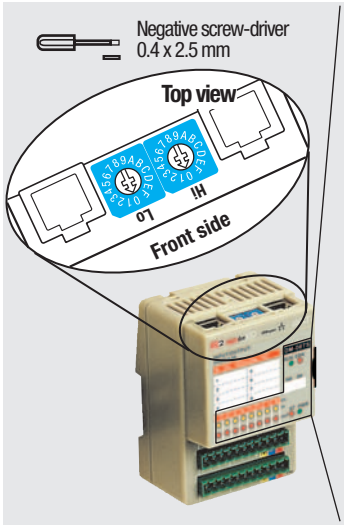
RPDO used by the module when the terminals are set as output channels

RPDO	Properties	Mapped objects	Index	Sub-index
RPD01	COBID: 200h+ NodeID Transmission Type: FFh	Write Digital output	6200h	01h
RPDO 2	COBID: 300h+ NodeID Transmission Type: FFh	Output pwm Value (ch 3) Output pwm Value (ch 4)	200Ah 200Ah	01h 02h
RPDO 3	COBID: 400h+ NodeID Transmission Type: FFh	Output pulse Value (ch 3) Output pulse Value (ch 4)	200Bh 200Bh	01h 02h
RPDO 4	COBID: 500h+ NodeID Transmission Type: FFh	Start Stop	200Dh	00h

Note: The transmission type is configurable; FFh is the default value.

Hardware Set-up

Hexadecimal rotary switches, service and I/O LEDs



Service LED	Status	Meaning
	ON	Operational
RUN	Blinking	Pre-operational (CANopen)
	Single flash	STOPPED
	OFF	Device in RESET state
	ON	BUS OFF
ERR	Single flash	Warning limit reached
	Double flash	Error Control Event
	Triple flash	Sync Error (CANopen)
	OFF	No error. Device working
	ON	DIAG Error
ST	Blinking	INIT and DIAG running
	Single flash	Baud rate setting
	OFF	Module OK and ready
PWR	ON	Module Power Supply ON
	OFF	Module Power Supply OFF

I/O LED	Status	Meaning
IN 1... 8	ON	Input active
	OFF	Input inactive
OUT 1... 8	ON	Output active
	OFF	Output inactive

Bit Rate and Node ID configuration

Bit rate

Lo switch	Baud rate kbps	Bus length m
1	20	2500
2	50	1000
3	100	500
4	125	500
5	250	250
6	500	100
7	800	50
8	1000	25

Node ID

Hi switch	Lo switch	Valid Node ID
0	1	01h (address 1)
0	2	02h (address 2)
↓	↓	↓
7	F	7Fh (address 127D)

Procedure for Node ID and Bit Rate configuration

The HI and LO hexadecimal rotary switches set the module's Bit Rate and CAN Node ID. During the configuration, the module must be **off line** and the CAN bus must be physically disconnected. To configure the module, follow the procedure:

1 Turn the Power OFF
2 Set the **HI** switch to "F"
3 Select the desired Bit Rate value by setting the **LO** switch following the table (e.g. "8" for 1 Mbps)
4 Turn the Power ON
5 Shift the **HI** switch to "E" (all the module service LEDs should flash)
6 Turn the Power OFF. Now configure Node ID
7 Set the **HI** and **LO** switches to the desired valid Node ID following the table
8 Turn the Power ON.

Alternatively, at step 7 set the value 00h. Then, at the next Power ON, the last valid stored value will be resumed as Node ID.

The default values are: Bit Rate = 20 kbps, Node ID = 127D

Parameter configuration

Index 2000h – Module Configuration

Each of the 8 channels of the module can be configured to be either an Input or an Output channel. In the Index 2000h each bit corresponds to a channel. Write 0 for inputs and 1 for outputs. All channels are inputs by default.

Bit	Bit 7	6	5	4	3	2	1	0
Channel	Ch 8	Ch 7	Ch 6	Ch 5	Ch 4	Ch 3	Ch 2	Ch 1
Default	0	0	0	0	0	0	0	0

Configuring the input channels

The functional block diagram for the Inputs is consistent with the standard profile CiA DS401 [2].

The digital signal is first filtered (**Index 6003h – Filter Constant Input 8-bit** and **Index 2004 - Filter Constant**), then polarised (**Index 6002 – Polarity Input 8-bit**) and finally assigned to the variable that contains its value

(**Index 6000h – Read Input 8-bit**). The information is now ready to be transmitted on the CAN network via the TPDO1. Other entries determine the trigger condition:

Index 6006h – Interrupt Mask Any Change 8-bit:
detection of any input level change

Index 6007h – Interrupt Mask Low-to-High 8-bit:
detection of a Low-to-High edge

Index 6008h – Interrupt Mask High-to-Low 8-bit:
detection of a High-to-Low edge

Index 6005h – Global Interrupt Enable:
the actual PDO transmission is performed if two initial conditions are met: the variable in Index 6005h should be "TRUE" and the PDO transmission type should be 255.

Proprietary input functions

In addition to the expected functions, the module provides a number of proprietary input function options. Input/option combinations are fixed, and determined by the value of the entry in the table below:

Index 2002h – Input options

Value	Option activated	Value	Option activated
0	No option	8	Period measurement on ch. 2
1	Frequency measurement on ch. 1	9	Period measurement on ch. 1, 2
2	Frequency measurement on ch. 2	10	Frequency measurement on ch. 1 and Counter on ch. 2
3	Frequency measurement on ch. 1, 2	11	Frequency measurement on ch. 1, Period measurement on ch. 2
4	Counter on ch. 1	12	Frequency measurement on ch. 2 and Counter on ch. 1
5	Counter on ch. 2	13	Frequency measurement on ch. 2, Period measurement on ch. 1
6	Counter on ch. 1, 2	14	Counter on ch. 1 and Period measurement on ch. 2
7	Period measurement on ch. 1	15	Counter on ch. 2 and Period measurement on ch. 1

An explanation of the added functions follows.

- **Input Latch:** Available for all inputs
  Index 2011h – Read Input Latch contains the value of the staticised inputs. The **Index 200Eh – Reset Latch** commands the resetting of a single latched input on a bit basis: writing 1 to the n-th bit resets the n-th input channel. The latching function acts after the filtering and polarity settings.
- **Input monostable:** Available for all inputs
  The input active value is maintained for a duration of time configurable with the **Index 2010h – Time Value** (8 element ARRAY, time base 5ms). The state of the inputs are kept in **Index 2012h – Read Input Wait**.
- **Frequency measurement**
  This function is able to measure the frequency of a periodic digital signal.
  The measure is stored in **Index 2006h – Input Frequency Value**. Two ranges of measure can be taken (the ranges for the two interested channels are the same):
  - range 0.015Hz – 2kHz (in 1mHz increments): in **Index 2005h – Set Frequency Range**, set the value 0
  - range 1Hz – 20kHz (in Hz increments): in **Index 2005h**, set the value 1.
  - In "RUN" state the acquired values are available at: **Index 2006h – Input Frequency Value** subindex 01h and/or 02h.

- **Pulse Counting**

This function performs a counting of the Low-to-High edges of the input signals (after filtering and polarity). The count value is stored in **Index 2007h – Input Count Value**. In **Index 200Dh – Start_Stop** you can start, stop or reset the counters:
bit 0 ➔ Start (1)/Stop (0) counter 1
bit 1 ➔ reset state (1)/enabled (0) counter 1
bit 2 ➔ Start (1)/Stop (0) counter 2
bit 3 ➔ reset state (1)/enabled (0) counter 2.

- **Period measurement**

With this function it is possibile to measure the period of a digital periodic input. The **Index 2008h – Input Period Value** contains the value of the measure (from 1ms to 65s, in 1ms increments). In **Index 200Dh – Start_Stop** you can start and stop the measure:
bit 4 ➔ Start (1)/Stop (0) period measurement on channel 1
bit 5 ➔ Start (1)/Stop (0) period measurement on channel 2

Configuring the output channels

The Output functional block diagram is consistent with the standard profile CiA DS401 [2]. The output signalling from a CAN message is processed first. Two pre-process items are performed:

- **Polarisation Index 6202h – Polarity Output 8-bit**

This object defines the polarity of a group of 8 output lines. Output polarity can be inverted individually:
1 = output inverted,
0 = output not inverted
If the object is not supported, the device behaves according to the default value.

- **Masking Index 6208h – Filter Mask Output 8-bit**

This object defines an additional output filter mask configurable for a group of 8 outputs.
1 = output is set to the received output value
0 = don't care, the received output value is neglected for the corresponding output channel and the old output value is kept.
If the object is not supported, the device behaves according to the default value.

Proprietary output functions

In addition to the expected functions, the module provides a number of proprietary output function options. Output/option combinations are fixed, and determined by the value of the entry in the table below:

Index 2003h – Output options

Value	Option activated	Value	Option activated
0	No options	8	PWM on ch. 3 and 4
1	PWM on ch. 3	9	Pulse on ch. 3
2	PWM on ch. 4	10	Pulse on ch. 4

- **Generation of a single pulse of programmable width**

Index 200Bh – Output Pulse Value
Assigns the value of the duration of the pulse within a range from 5ms to 65s, in 5ms steps. Please note that the Output Pulse Value has be expressed in ms.
Index 200Dh – Start Stop Mode In RUN mode, this entry determines the trigger of the pulse. It should be noted that the pulse function is not subject to polarity and filter mask. The generated pulse consists of a Low-to-High edge and, at the end of programmed width, of an High-to-Low edge:
bit 6 ➔ Start (1) ch. 3.
bit 7 ➔ Start (1) ch. 4
Please note that bits 6 and 7 are automatically reset by the device, i.e. they are ready for any subsequent pulse.

- **PWM pulse generation**

Index 2009h –PWM Frequency
Assigns the frequency value of the PWM pulse, ranging from 0.015Hz to 4kHz, in 1mHz steps. Please note that the value is the same for both channels.

Index 200Ah –Output PWM Value
Assigns pulse duty cycle value from 0.0 to 100.0 per cent, in 0.1% steps.
In this case the **Index 6200h – Write Output 8-bit** (subindex 01h) acts as general enabler. Set to "1" the bit associated to the PWM channel you want to enable.

Error mode (or STOPPED NMT state)

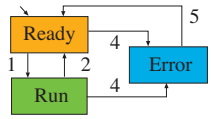
In error mode, the outputs behave according to the following two entries
Index 6206 – Error Mode Output 8-bit
Defines the behaviour of the outputs in the error or STOPPED states.

- In the event of a standard digital output, if the corresponding bit is set to 0 the output is maintained at the current value; if set to 1 the value of the corresponding bit of **Index 6207h – Error Value Output 8-bit** is assigned to the output.
- In the event of PWM output the behaviour is similar, but with an additional step. If the corresponding bit of **Index 6206 – Error Mode Output 8-bit** is 0 then the current duty cycle is kept, otherwise the **Index 6207h – Error Value Output 8-bit** is analised further. If the corresponding bit of Index 6207h is 0 then the duty cycle is forced to 0, otherwise the emergency duty cycle value **Index 2013h – PWM Error Value** is assigned.

Commands

Index 200Ch – Operating mode

The device has its own internal state machine. It is possible to move through this by sending appropriate values to the Index 200Ch, following the table below.



Transition	Operating mode value	Behaviour
Init	-	At Power-Up, the Device is in the "ready" state. Transition 1 is also executed if Index 200Ch - Operating Mode contains the default value 1
1	01h	Operating mode "RUN" is activated
2	00h	Return to the initialisation "ready" state. The transition is performed: • following an operator's command • after assigning a configuration parameter (2000h, 2002h, 2003h, 2004h, 2005h, 2009h and 2010h)
4	FFh	The "error" state is automatically assigned by the device (and the operating mode value is read only) when: • an attempt is made to execute an unexpected command
5	00h	This value causes an exit from the "error" state, after the error condition is acknowledged. The only transition is to the "ready" state

Emergency messages

The module automatically sends emergency messages including error codes. The communication errors are descrided in CiA DS301 [1]. The error codes are expressed as a DEVICE SPECIFIC ERROR type of code. The codes indicating a specific condition are also inserted, following the table below:

Error code	Error
0000000000	**No error** –This code is generated when exiting an error contidion, to notify the end of one of the error states
0000000007	**Error Wrong Command** – An attempt to execute a command from an illegal state

	0	1	2	3	4	5	6	7
Emergency Message	01h	FFh	21h	00h	00h	00h	00h	0yh
	COB – ID = [entry 1014h] + NodeID							
				Error code				

Parameter Store/Restore

This module allows parameters to be saved in a non volatile memory. In order to avoid storing parameters by mistake, storage is only executed when a specific signature is written to the appropriate subindex. The signature is "save". Similarly, the default values of parameters, according to the communication or device profile, are restored.

On receipt of the correct signature in the appropriate subindex, the device restores the default parameters and then confirms the SDO transmission. The signature is "load".

The new configuration becomes active after a reset, i.e. after a "Power OFF/Power ON cycle" or an NMT "Reset Node" message.

Byte	0	1	2	3	4	5	6	7
Store Parameter	22h	10h	10h	01h	73h	61h	76h	65h
					s	a	v	e
	COB – ID = 600h + NodeID							
Restore Parameter	22h	11h	10h	01h	6Ch	6Fh	61h	64h
					l	o	a	d
	COB – ID = 600h + NodeID							

SDO Messages

The entries of a device Object Dictionary are accessed trough SDO (Service Data Object) messages. The basic SDO messages are as follows, as based on the Client – Server request and response model:

Byte	0	1	2	3	4	5	6	7
Read Request	40h	Index		Sub-Index	Reserved			
	COB – ID = 600h + NodeID							
Read Response	4Fh	Index		Sub-Index	Data			
	COB – ID = 580h + NodeID							
Write Request	22h	Index		Sub-Index	Data			
	COB – ID = 600h + NodeID							
Write Response	60h	Index		Sub-Index	Reserved			
	COB – ID = 580h + NodeID							

Reference documents

List of CiA documents to which the user should refer
[1] CiA DS301 - CANopen Application Layer and Communication Profile
[2] CiA DS401 - CANopen Device Profile: for generic I/O modules

Accessories, Spare Parts and Warranty

Power Supply 45W 24Vdc 2A AP-S2/AL-DR45-24
Power Supply 120W 24Vdc 5A AP-S2/AL-DR120-24
Additional Terminal Block 2x11 AP-S2/TB-211-1
Female Plug 11 Screw clamp AP-S2/SPINA-V11
Female Plug 11 Spring clamp AP-S2/SPINA-M11
RJ45 terminated cable 14cm AP-S2/LOCAL-BUS76
RJ45 terminated cable 22cm AP-S2/LOCAL-BUS152
CAN Bus termination Adapter AP-S2/TERM-CAN

Warranty: 3 years excluding defects due to improper use

Object Dictionary (with default values)

⚠ In order to configure the module, it is necessary to connect it to a PC with the CAN interface and the superivisory software installed. The configuration can be obtained by writing the desired values to the module's variables listed in the Object Dictionary.

Object Dictionary structure

Index (hex)	Sub Index	Object	Name	Default [hex]	Type	Acc. Attr.	MO
1000		VAR	Device Type	00030191	UNSIGNED32	RO	M
1001		VAR	Error Register	00	UNSIGNED8	RO	M
1003		ARRAY	Predefined error field	00000000		RO	O
1005		VAR	COB-ID SYNC	00000080	UNSIGNED32	RW	O
1006		VAR	Communication cycle period	00000000	UNSIGNED32	RW	O
1007		VAR	Synchrounous window length	00000000	UNSIGNED32	RW	O
1008		VAR	Manufacturer Device Name	"08TS"	Vis-String	const	O
1009		VAR	Manufacturer Hardware Version	"1.00"	Vis-String	const	O
100A		VAR	Manufacturer Software Version	"1.00"	Vis-String	const	O
100C		VAR	Guard Time	0000	UNSIGNED16	RW	O
100D		VAR	Life Time Factor	00	UNSIGNED8	RW	O
1010		ARRAY	Store Parameters				O
	00h	VAR	Largest subindex supported	01	UNSIGNED8	RO	
	01h	VAR	Save all parameters	03	UNSIGNED32	RW	
1011		ARRAY	Restore Default Parameters			RW	O
	00h	VAR	Largest subindex supported	01	UNSIGNED8	RO	
	01h	VAR	Restore all default parameters	01	UNSIGNED32	RW	
1014		VAR	COB-ID EMCY	80 + NodeID	UNSIGNED32	RW	O
1015		VAR	Inhibit Time EMCY	0000	UNSIGNED16	RW	O
1017		VAR	Producer heartbeat time	0000	UNSIGNED16	RW	O
1018		RECORD	Identity Object		Identity (23h)		M
	00h	VAR	Number of entries	01	UNSIGNED8	RO	
	01h	VAR	Vendor ID	000000E9	UNSIGNED32	RO	
1200		RECORD	Server SDO Parameters		SDO Param (22h)		O
	00h	VAR	Number of entries	02	UNSIGNED8	RO	
	01h	VAR	COB-ID Client -> Server	600+NodeID	UNSIGNED32	RO	
	02h	VAR	COB-ID Server -> Client	580+NodeID	UNSIGNED32	RO	
1400		RECORD	1st Receive PDO Comm Par.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	02	UNSIGNED8	RO	
	01h	VAR	COB-ID used	200+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF	UNSIGNED8	RW	
1401		RECORD	2nd Receive PDO Comm Par.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	02	UNSIGNED8	RO	
	01h	VAR	COB-ID used	300+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF	UNSIGNED8	RW	
1402		RECORD	3rd Receive PDO Comm Par.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	02	UNSIGNED8	RO	
	01h	VAR	COB-ID used	400+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF	UNSIGNED8	RW	
1403		RECORD	4th Receive PDO Comm Par.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	02	UNSIGNED8	RO	
	01h	VAR	COB-ID used	500+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF	UNSIGNED8	RW	
1600		RECORD	1st Receive PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	N° of mapped application obj	01	UNSIGNED8	RO	
	01h	VAR	DigOutput8_1	62000108	UNSIGNED32	RO	
1601		RECORD	2nd Receive PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	N° of mapped application obj	02	UNSIGNED8	RO	
	01h	VAR	Value Output PWM1	200A0110	UNSIGNED32	RO	
	02h	VAR	Value Output PWM2	200A0210	UNSIGNED8	RO	
1602		RECORD	3rd Receive PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	N° of mapped application obj	02	UNSIGNED8	RO	
	01h	VAR	Value Output Pulse1	200b0110	UNSIGNED32	RO	
	02h	VAR	Value Output Pulse2	200b0210	UNSIGNED32	RO	
1603		RECORD	4th Receive PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	N° of mapped application obj	01	UNSIGNED8	RO	
	01h	VAR	Start Stop	200D0008	UNSIGNED32	RO	
1800		RECORD	1st Transmit PDO Comm Par.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	05	UNSIGNED8	RO	
	01h	VAR	COB-ID used	180+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0000	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0000	UNSIGNED16	RW	
1801		RECORD	2nd Transmit PDO Comm Par.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	05	UNSIGNED8	RO	
	01h	VAR	COB-ID used	280+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0000	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0000	UNSIGNED16	RW	
1802		RECORD	3rd Transmit PDO Comm Par.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	05	UNSIGNED8	RO	
	01h	VAR	COB-ID nused	380+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0000	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0000	UNSIGNED16	RW	
1803		RECORD	4th Transmit PDO Comm Par.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	05	UNSIGNED8	RO	
	01h	VAR	COB-ID used	480+NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0000	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0000	UNSIGNED16	RW	
1A00		RECORD	1st Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	N° of mapped application obj	03	UNSIGNED8	RO	
	01h	VAR	DigInput8_1	60000108	UNSIGNED32	RO	
	02h	VAR	Read Input Latch1	20110108	UNSIGNED32	RO	
	03h	VAR	Read Wait Input1	20120108	UNSIGNED32	RO	
1A01		RECORD	2nd Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	N° of mapped application obj	02	UNSIGNED8	RO	
	01h	VAR	Value Input Frequency1	20060120	UNSIGNED32	RO	
	02h	VAR	Value Input Frequency2	20060220	UNSIGNED32	RO	
1A02		RECORD	3rd Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	N° of mapped application obj	02	UNSIGNED8	RO	
	01h	VAR	Value Input Count1	20070120	UNSIGNED32	RO	
	02h	VAR	Value Input Count2	20070220	UNSIGNED32	RO	
1A03		RECORD	4th Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	N° of mapped application obj	02	UNSIGNED8	RO	
	01h	VAR	Value Input Period1	20080120	UNSIGNED32	RO	
	02h	VAR	Value Input Period2	20080220	UNSIGNED32	RO	
2000		VAR	Module Configuration	00	UNSIGNED8	RW	O
2002		VAR	Input Option	00	UNSIGNED8	RW	O
2003		VAR	Output Option	00	UNSIGNED8	RW	O
2004		ARRAY	Filter Constant				O
	00h	VAR	NrOfObjects	08	UNSIGNED8	RO	
	01h	VAR	Filter Constant 1	00	UNSIGNED8	RW	
	...	...	Filter Constant 2...7	00	...	...	...
	08h	VAR	Filter Constant 8	00	UNSIGNED8	RW	
2005		VAR	Set Frequency Range	00	UNSIGNED8	RW	O
2006		ARRAY	Input Frequency Value				O
	00h	VAR	NrOfObjects	02	UNSIGNED8	RO	
	01h	VAR	Input Frequency1 Value	00000000	UNSIGNED32	RO	
	02h	VAR	Input Frequency2 Value	00000000	UNSIGNED32	RO	
2007		ARRAY	Input Count Value				O
	00h	VAR	NrOfObjects	02	UNSIGNED8	RO	
	01h	VAR	Input Count1 Value	00000000	UNSIGNED32	RO	
	02h	VAR	Input Count2 Value	00000000	UNSIGNED32	RO	
2008		ARRAY	Input Period Value				O
	00h	VAR	NrOfObjects	02	UNSIGNED8	RO	
	01h	VAR	Input Period1 Value	00000000	UNSIGNED32	RO	
	02h	VAR	Input Period2 Value	00000000	UNSIGNED32	RO	
2009		VAR	PWM Frequency	00000000	UNSIGNED32	RW	O
200A		ARRAY	Value Output PWM				O
	00h	VAR	NrOfObjects	02	UNSIGNED8	RO	
	01h	VAR	Output PWM1 Value	0000	UNSIGNED16	RW	
	02h	VAR	Output PWM2 Value	0000	UNSIGNED16	RW	
200B		ARRAY	Output Pulse Value				O
	00h	VAR	NrOfObjects	02	UNSIGNED8	RO	
	01h	VAR	Output Pulse1 Value	0000	UNSIGNED16	RW	
	02h	VAR	Output Pulse2 Value	0000	UNSIGNED16	RW	
200C		VAR	Operation Mode	01	UNSIGNED8	RW	O
200D		VAR	Start Stop	00	UNSIGNED8	RW	O
200E		ARRAY	Reset Latch				O
	00h	VAR	NrOfObjects	01	UNSIGNED8	RO	
	01h	VAR	Reset Latch1	00	UNSIGNED8	RW	
2010		ARRAY	Wait Time Value				O
	00h	VAR	NrOfObjects	08	UNSIGNED8	RO	
	01h	VAR	Wait Time 1 Value	0000	UNSIGNED16	RW	
	...	...	Wait Time 2...7 Value	0000	...	...	...
	08h	VAR	Wait Time 8 Value	0000	UNSIGNED16	RW	
2011		ARRAY	Read Input Latch				O
	00h	VAR	NrOfObjects	01	UNSIGNED8	RO	
	01h	VAR	Read Input Latch1	00	UNSIGNED8	RO	
	2012	ARRAY	Read Input Wait				O
	00h	VAR	NrOfObjects	01	UNSIGNED8	RO	
	01h	VAR	Read Input1 Wait	00	UNSIGNED8	RO	
2013		ARRAY	PWM Error Value				O
	00h	VAR	NrOfObjects	02	UNSIGNED8	RO	
	01h	VAR	PWM Error Value1	0000	UNSIGNED16	RW	
	02h	VAR	PWM Error Value2	0000	UNSIGNED16	RW	
3000		VAR	Node Address	7F	UNSIGNED8	RO	O
3001		VAR	Node Baudrate	01	UNSIGNED8	RO	O
6000		ARRAY	Read Input 8-bit				M
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	DigInput8_1	00	UNSIGNED8	RO	
6002		ARRAY	Polarity Input 8-bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	Polarity8_1	00	UNSIGNED8	RW	
6003		ARRAY	Filter Constant Input 8-bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	FilterConst8_1	00	UNSIGNED8	RW	
6005		VAR	Global Interrupt Enable Digital	TRUE	BOOLEAN	RW	O
6006		ARRAY	Interrupt Mask Any Change 8-bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	InterruptAnyChange8_1	FF	UNSIGNED8	RW	
6007		ARRAY	Interrupt Mask Low to High 8-bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	InterruptLowToHigh8_1	00	UNSIGNED8	RW	
6008		ARRAY	Interrupt Mask High to Low 8-bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	InterruptHighToLow8_1	00	UNSIGNED8	RW	
6200		ARRAY	Write Output 8-Bit				M
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	DigOutput8_1	00	UNSIGNED8	RW	
6202		ARRAY	Polarity Output 8-Bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	Polarity8_1	00	UNSIGNED8	RW	
6206		ARRAY	Error Mode Output 8-Bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	ErrorMode8_1	FF	UNSIGNED8	RW	
6207		ARRAY	Error Value Output 8-Bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	ErrorValue8_1	00	UNSIGNED8	RW	
6208		ARRAY	Filter Mask Output 8-Bit				O
	00h	VAR	Number of Elements	01	UNSIGNED8	RO	
	01h	VAR	FilterMask8_1	FF	UNSIGNED8	RW	